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December 19, 2012

Sherry Burt-Kested, Manager
Environment, Land and Water
Chino Mines Company
Freeport-McMoRan Copper & Gold, Inc.
Box 10
Bayard, NM 88023

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Re: **Development of Site-Specific Copper Criteria Interim Report
Smelter and Tailing Soils Investigation Unit (STSIU) Drainages (October 2012)
Chino Administrative Order on Consent**

Dear Ms. Burt-Kested:

The New Mexico Environment Department (Department) received the above report on October 5, 2012 from Chino Mines Company (Chino). The accompanying cover letter states:

"Following NMED Surface Water Quality Bureau review of this report and consensus on the final dataset and WER calculation method, a subsequent technical report will be developed and submitted that describes the agreed upon approach to develop and apply copper site specific to the study area at Chino Mine."

In general, the Department finds that the report presents a summary of results and the data appear to be acceptable for deriving water effect ratios (WERs). Regarding the WER calculation method, the Department recommends using the denominator calculated from both nominal and measured dissolved copper concentrations (19.31 µg/L) for reasons detailed below.

The Department cannot determine whether the data are sufficient to develop site-specific criteria (SSC) that can be applied to STSIU waters because details on the SSC model are not provided in the report. Given the variability in water chemistry at the site documented in the report, the Department is concerned that the data may not be adequate to develop a robust SSC model.



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Chino is advised that a new SSC represents a water quality criteria change. Proposals to revise water quality standards are reviewed for usability in New Mexico's water quality management programs under the authorities granted to the New Mexico Water Quality Control Commission and the U.S. EPA.

Specific comments on the report (by section) are provided below. Text shown in *italics* is quoted from the report.

1. Introduction and Background

SWQB subsequently provided comments and an acknowledgement of their approval in a letter dated September 1, 2011.

The Department's response letter was not an acknowledgement of approval. We wish to clarify that the September 1, 2011 letter to Timothy Eastep provided comments on the work plan submitted in August, 2011. As stated in the Department's letter, the work plan did not require approval and the letter was not an approval.

The Department's September 1, 2011 letter makes the following statement:

The 1994 Interim Guidance states that a work plan for determination of a WER should be submitted to the appropriate regulatory authority for comment. The Department's comments herein do not constitute approval or disapproval of the Work Plan. Additionally, neither the comments nor Chino's responses, should any responses be provided, will constitute assurance that the results of the work will be acceptable to the Department or any other regulatory authority. The Department notes that EPA guidance is not specifically applicable to the conditions of the investigation unit, and that the Work Plan does not require Department approval.

Chino provided the October 2012 interim report to the Department for review. As was the case for the work plan, these comments do not constitute assurance that the results of the work will be acceptable to the Department or any other regulatory authority.

1.1 Study Objectives; 1.2 Summary Findings

The primary objectives for the study are listed in Section 1.1 Study Objectives, and stated below:

The primary objectives of this report are to report all data collected as well as any deviations from the work plan, evaluate all collected data with quality control criteria described in the WER guidance (USEPA 1994, 2001), and determine if the collected data are sufficient to develop SSC that can be applied to STSIU surface waters.

Section 1.2 lists findings, but some are beyond the primary objectives listed in the previous section, Section 1.1 Study Objectives). For example, the findings include statements *that variability in water chemistry across the STSIU is captured, and that input variables for the equation to determine copper SSC are proposed*. Objectives for the study should be clearly stated; methods, results and findings should support the objectives.

Regarding the objectives listed in Section 1.1, it appears that the report includes the data and that the data was generally as described in the work plan and meets quality control criteria.

The report states that the *variability in water chemistry across the STSIU is captured*. It is true that the samples represent water chemistry across a spatially and temporally diverse range, perhaps as wide a range as can be captured given the limited water available in the STSIU. However, while the samples may capture sufficient variability to support the study, the report provides no basis to conclude that the samples account for all of the variability.

The report also states that *input variables for the equation to determine copper SSC are proposed, and a robust copper SSC model can be developed from these data*. The Department finds no basis to conclude that a robust SSC model can be developed. The two discrete sampling events with a total of 18 WER measurements may represent the range of WERs that can be expected across the STSIU. The Department cannot say whether data are sufficient to develop SSC that can be applied to STSIU waters because the details on the SSC were not provided. Also, the Department is concerned that given the range of water chemistry, the data may not be adequate to develop a robust SSC model. Notably, except for the WER, the report does not propose input variables for the equation to determine the copper SSC. Upon submittal of the subsequent technical report (as described in the study objectives on page 2), the Department may be able to evaluate the approach and the input variables for the SSC model.

The report recommends that a recalculated species mean acute value (SMAV) based on the measured EC50 values from EPA (2001)¹ is the appropriate value for the WER denominator from four potential WER denominators considered. The Department does not agree. See comments under **Conclusions and Recommendations**.

4. Discussion

This section includes this statement: *Based on preliminary analysis of the site-specific toxicity and chemistry data, specific parameters that appear account for most of the range of toxicity include organic carbon, alkalinity, hardness, and total dissolved solids*.

This preliminary analysis is not presented in the report. The data indicate that the variables of total dissolved solids and alkalinity are correlated to hardness. For the normalized EC50, hardness is accounted for by the normalization. Because of the correlation, total dissolved solids and alkalinity may be accounted for by hardness. Organic carbon is not correlated with hardness.

¹ EPA. 2001. *Streamlined Water-Effect Ratio Procedure for Discharges of Copper*. EPA-822-R-01-005. U.S. Environmental Protection Agency, Washington, D.C.

5. Conclusions and Recommendations

The report recommends that a recalculated SMAV based on the measured copper concentrations from Appendix B of EPA (2001) be used for the WER denominator; the value is 16.50 µg/L for dissolved copper. The Department does not find a compelling basis for the use of this value in the report. The Department observes that all WER denominators are in general agreement and the choice of denominator has a relatively small impact on the calculated WER values compared to the variability in the site water chemistry.

Instead of the value recommended in the Chino report, the Department suggests using the denominator calculated from both nominal and measured copper concentrations shown in Appendix B, EPA (2001); the value is 19.31 µg/L for dissolved copper. The basis for this recommendation is as follows:

- According to EPA (2001) guidance: “the WER...is the lesser of (a) the site-water EC50 divided by the laboratory-water EC50, or (b) the site-water divided by the documented Species Mean Acute Value...” Use of the 19.31 µg/L Species Mean Acute Value results in the lesser WER.
- The report cites EPA guidance (2007)², which says that there are enough measured LC50s that the use of nominal concentrations is no longer warranted. In EPA (2007), the authors were referring to concentrations for use in developing copper criteria based on the Biotic Ligand Model, and this comment may not be appropriate for the development of a WER.
- Use of only the measured EC50 values significantly reduces the number of studies used for development of the SMAV values from 16 to 6.
- Studies reported in EPA (2001) for another daphnid species (*Ceriodaphnia dubia*; eight studies) with measured copper concentrations result in an even higher SMAV of 22.11 µg/L for the dissolved value, which would result in an even lower WER.

The following corrections to the report are suggested:

Page 13. B-110 (*D. Magna*) should be B2-110 (*D. Magna*)

Page 25. ARCADIS. 2010 should be ARCADIS 2011.

Table 9. There seems to be a problem with the second, third and fourth rows under wet chemistry.

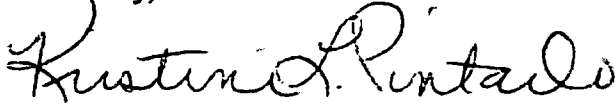
Table 17. II 20.12 = SMAV reported by USEPA (2001) for dissolved copper should be for total copper.

² EPA. 2007. Aquatic Life Ambient Freshwater Quality Criteria – Copper: 2007 Revision. EPA-822-R-07-001. U.S. Environmental Protection Agency, Washington, D.C.

Sherry Burt-Kested
December 19, 2012
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If you have questions about these comments, please contact me at (505) 827-2822.

Sincerely,



Kris Pintado
Standards Team Leader
NMED SWQB

cc: via e-mail

Shelly Lemon, NMED SWQB

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